N.A.C.A. BULLETIN

In Three Sections

Section One

THE PRACTICAL ECONOMIST'S PROFIT AND LOSS STATEMENT
by G. CHARTER HARRISON 443

DETERMINATION OF "LIFO" INVENTORY VALUATION UNDER THE RETAIL INVENTORY METHOD
by LEON M. NAD 457

ALLOCATING ROADHAUL COSTS TO TERMINALS FOR A COMMON MOTOR FREIGHT CARRIER
by M. C. SPAAN 467

VOL. XXX, NO. 8 DECEMBER 15, 1948

EDITORIAL DEPARTMENT NOTE

Division of revenue producing or revenue related costs into categories of fixed and variable has been widely effected for the purpose of obtaining the benefits of flexible budgeting, particularly in respect of cost control. Whether or not fixed costs are a proper part of cost valuations for inventory purposes has also been given a certain amount of attention and has been debated pro and con. However, it cannot be said that segregation of costs into fixed and variable elements within the form of the profit and loss statement has been accorded general consideration. Such segregation is advocated in our first article which makes a forthright case for a profit and loss statement of the marginal type.

The author of the paper is G. CHARTER HARRISON, Senior Partner, G. Charter Harrison Associates, Madison, Wis. Mr. Harrison has had long experience in the accounting and industrial engineering fields dating from the years preceding World War I. He is the author of two books and many articles on the subject of standard costs.

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Especial interest in the second article in this issue may well be expected from three directions. It deals with the subject of "lifo," which at once relates it to the fields of inventories and of Federal income taxes. More particularly, it deals with the application of the "lifo" basis to the valuation of inventories maintained under the retail method so-called, by application of price indices to eliminate changes during the period attributable to fluctuation in purchasing power of the dollar, and so also to isolate the quantity change in dollar terms. This procedure, recently made officially available to retailers through court decision and subsequent bureau regulations, may well stimulate thought among those who have seen in price indices a means for recognizing in accounting records the ups and downs of the "real" value of the dollar.

The presentation is the work of LEON M. NAD, Instructor in Accounting, Wharton School of Finance and Commerce, University of Pennsylvania. Mr. Nad is a graduate of Rice Institute, Houston, Texas, and has received his Master's degree in Business Administration from his present connection.

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A widespread interest exists with respect to the motor transportation industry and its problems. One of these relates to the preparation of profit and loss statements for each terminal. In this process, it is customary to split freight revenue equally between terminals of origin and destination of items carried. Although many operating costs are clearly identifiable with the respective terminals, some are not and, of these, the most important dollar-wise is the category of roadhaul costs. A practical procedure for their allocation is set forth in our final article.

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This *Bulletin* is published semimonthly by the National Association of Cost Accountants, 385 Madison Ave., New York 17, N. Y. Subscription price, $10 per year. Entered at the Post Office, New York, N. Y., as second-class matter August 28, 1925, under the Act of March 3, 1879.

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DECEMBER 15, 1948

THE PRACTICAL ECONOMIST'S PROFIT AND LOSS STATEMENT

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IN a recent article Erwin H. Schell, Head of the Department of Business and Engineering Administration of the Massachusetts Institute of Technology, made the statement that *"there is real opportunity for the spread of arithmetic in high places."* In this connection it may be stated that the foundation of the science of profit-making, to which I have given the name of practical economics, as well as of all the other sciences, is the simple arithmetic involved in the determination of the *relationships between variables.* The science of profit-making is the field of the practical economist who is interested in the production of wealth, not of the universe, not of Europe, not of the United States of America, not of any particular industry as a whole, but of the John Doe Corporation or of John Doe, individual business proprietor.

This article is devoted to the theses (1) that variable and fixed elements of cost are separable on a practical basis by the application of relatively simple arithmetical methods and (2) that, this being so, it seems a serious and obvious oversight not to effect the separation of these elements in profit and loss statements when such separation holds the key to the present outlook and future planning of the operations of any company.

Separating Fixed and Variable Elements of Related Data

First, it may be well to substantiate the assertion that, for all practical purposes, the separation can be made from fairly brief data series. A simple illustration is the relationship between weekly labor hours and production per thousand tons in the steel industry, using Moody's data for the United States Steel Company for a period of five years. Can we tell the fixed and variable labor hours from this information? The answer is that we can and that, with like simplicity, we can also determine fixed and variable elements of operating data. In particular cases, some judgment must be exercised in order not to include figures so out of line as to suggest abnormality.

For our present example, the following are the figures to work with:

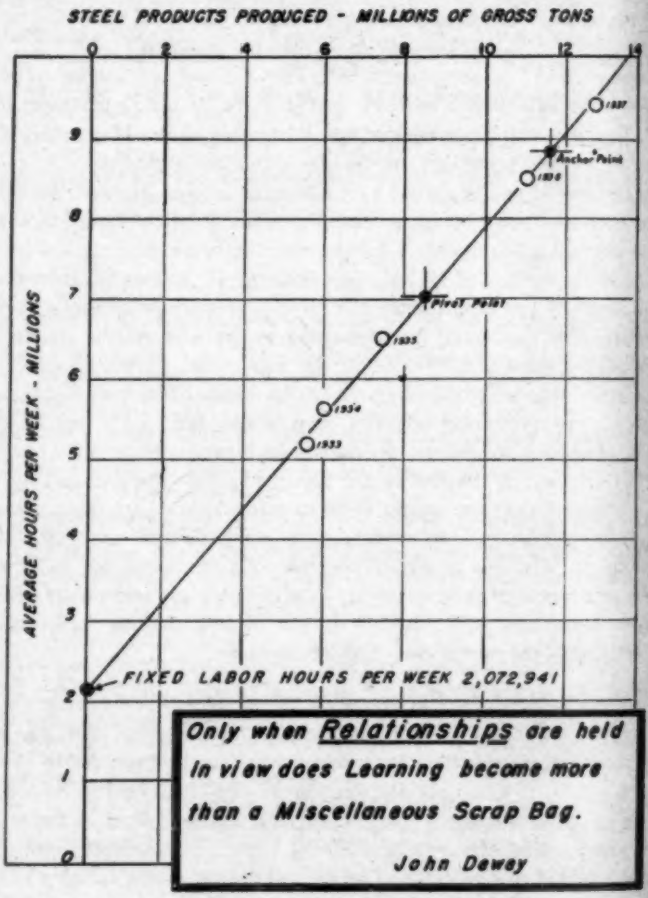
STEEL PRODUCTS PRODUCED - MILLIONS OF GROSS TONS
0
2
4
6
8
10
12
14
AVERAGE HOURS PER WEEK - MILLIONS
0
1
2
3
4
5
6
7
8
9
1937
Anchor Point
1936
Pivot Point
1935
1934
1933
FIXED LABOR HOURS PER WEEK 2,072,941
Only when Relationships are held in view does Learning become more than a Miscellaneous Scrap Bag.
John Dewey
UNITED STATES STEEL CORPORATION 1933 to 1937
RELATIONSHIP BETWEEN HOURS AND PRODUCTION

EXHIBIT 1

Year	Average employee hours per week	Thousands of gross tons
1933	5,169,220	5,536
1934	5,635,402	6,005
1935	6,471,650	7,474
1936	8,525,022	11,030
1937	9,456,194	12,762
Total	35,257,488	42,807
Average	7,051,498	8,561.4

The simple mathematics involved from this point on may become even simpler if illuminated graphically along the way. If the above data by years were plotted, the points would show as in Exhibit 1 and a common line could be drawn. This line would just miss the points for *specific* years but the *average* would be exactly on it (designated as pivot point on the graph). However, we really have our line ahead of time by freehand drawing. Actually, its slope represents ratio of variability of labor hours to steel produced and we must fix the line with a second point. We can do this by taking the labor hours and production for the years of greater than average volume (less than average could be used equally well) and averaging them within themselves as follows:

Year	Average employee hours per week	Thousands of gross tons
1936	8,525,022	11,030
1937	9,456,194	12,762
Total	17,981,216	23,792
Average	8,990,608	11,896

This new average supplies another point (anchor point on the graph) and fixes the line. But what about the arithmetic? Well, how does the line slope between the two points? The figures tell when arranged as follows (symbols opposite four of them are for identification in the succeeding material, which affords the generally applicable formulae):

	Labor hours go up	*while*	*Thousands of gross tons go up*
Two year average.....	8,990,608		11,896
Less five year average. (C)	7,051,498	(A)	8,561.4
Increases .....(D)	1,939,110	(B)	3,334.6

The above process has developed factors which we have designated as A, B, C and D. From them we wish to find variable hours per thousand gross tons, which may be designated as Factor V, and fixed hours, which may be designated as Factor F. The relationship of increase in gross tons to increase in labor hours is expressed above in the relationship of Factor D to Factor B. Hence—

The formula for variable hours is:

$$V = \frac{D}{B} = \frac{1{,}939{,}110}{3{,}334.6} = 581.512 \text{ hours per thousand gross tons.}$$

It will also be clear that fixed hours must be total hours less variable hours at the particular tonnage. Hence—

The formula for fixed hours is:

$$F = C - (A \times V) = 7{,}051{,}498 - 4{,}978{,}557 = 2{,}072{,}941.$$

The line determined by the pivot and anchor points will carry down to zero production at the fixed hour figure which has been arrived at by formula. The utility of the formulae may be further illustrated by taking an arbitrary production figure, say twelve million gross tons, and applying them:

Variable hours	
12,000 × 581.512 (Factor V) =	6,978,144
Fixed hours	
Factor F as above	2,072,941
Total hours	9,051,085

Reference to the chart will indicate that the hours reading on the diagonal line at 12,000,000 gross tons is, in fact, approximately the total hours figure just arrived at.

What the Conventional Profit and Loss Statement Will Not Do

Transferring our attention now to operating data, our objective is simply stated. We want to build up a profit pattern. We want first to know the current pattern and to be able to revise it intelligently to a more favorable one. A profit pattern has been likened to a road map and the metaphor is a good one. The function of a road map is to show the way from *here* to *there* and it is appropriate that a profit pattern should have as its foundation a current profit situation, the *here,* and build up from this the destination desired, the *there,* in terms of a planned profit. Why will the conventional profit and loss statement, shown at the lower left of Exhibit 2, not permit of this? Because no matter how the figures shown on this type of statement are divided and subdivided, its primary defect, absence of provision for separation between fixed and variable costs, obscures the meaning of the figures.

The following are a few of the things which demand a separation between fixed and variable costs:

1. The determination of *operating efficiencies.*
2. The determination of the *minimum prices* at which goods can be sold without loss.
3. The determination of the *relative profitableness* of different products.
4. The determination of the reasons for *variations in manufacturing costs.*
5. The determination of the reasons for *variations in net profits as between periods.*
6. The determination of the *true profit contributions* of individual branches, products, classes of customers, and salesmen.
7. The determination of *how much can be profitably spent* in additional selling, merchandising, and advertising effort to secure *increased sales volume.*
8. The *forecasting of profits* at different sales volumes.
9. The forecasting of profits at *any combination of sales volume, and increases in raw material costs, selling prices, and labor rates.*
10. The determination of *sales breaking points.*
11. The determination of *production costs at varying rates of production.*
12. The formulation of a *profit pattern* which will quickly and

CONVENTIONAL PROFIT & LOSS STATEMENT

	AMOUNT	% OF SALES
NET SALES	3 988 519	100 00 %
COST OF SALES	2 649 080	66 42
GROSS PROFIT	1 339 459	33 58
SELLING & ADMIN EXP	595 900	14 94
OPERATING PROFIT	743 559	18 64

Cannot be successfully used for Projection Purposes or the Determination of Profit Possibilities because of lack of separation between Fixed and Variable Costs

THE PRACTICAL ECONOMISTS PROFIT & LOSS STATEMENT

	CURRENT PATTERN AMOUNT	CURRENT PATTERN % OF SALES	PATTERN REVISIONS PER CENT	PATTERN REVISIONS AMOUNT	REVISED PATTERN
NET SALES	3 988 519	100.000 %			3 988 519
VARIABLE COSTS OF SALES					
Material	1 314 674	32.966	18.3 %	240 622	1 555 496
Labor	699 115	17.533	12.9 %	73 702	645 317
Expense	370 071	9.284			370 071
TOTAL VARIABLE COSTS	2 283 860	57.283		314 324	2 597 884
MARGINAL BALANCE	1 704 999	42.747		314 324	1 390 635
VARIABLE SELLING EXPENSE	414 036	10.381			414 036
NET MARGINAL BALANCE	1 290 933	32.366		314 324	976 609
FIXED EXPENSES					
Labor	145 045	3.637	12.5 %	18 131	163 176
Expense	408 302	10.237		50 000	458 302
TOTAL FIXED EXPENSE (1)	547 374	13.724		68 131	615 606 (2)
OPERATING PROFIT (3)	743 559	18.642		382 445	361 104 (4)
Breaking Point (5)	1 681 189				3 813 793 (6)

EXHIBIT 2

accurately answer many of the most important questions a manufacturer will ask.

A Potentially Dangerous Document

The apparent simplicity of the conventional profit and loss statement is highly deceptive. There is dynamite in a profit and loss statement for those who do not realize what a dangerous document it can be, and I have known concerns to go out of business with startling suddenness because their presidents mistakenly thought they understood profit and loss statements and acted on the basis of this assumed understanding.

For example, when the depression which started in 1929 was getting under way, the president of a fairly large manufacturing concern asked for an analysis of profit and loss by individual salesmen. It showed one half of the men in the red and they were summarily released as nonproducers. However, when the next month's statement arrived, the whole sales force (and the business) was in the red. The reason for this episode was the major shortcoming of conventional profit and loss disclosure. The accountant had credited the men with gross profits on their sales and charged them with their salaries and expenses, the difference representing, as he thought, the profit or loss realized from the respective salesmen's efforts. However, the gross profit figures represented excess of net sales over cost of goods sold, both fixed and variable. After the discharge of the "loss" salesmen, their share of the fixed costs fell upon the cost of goods sold by the rest, who promptly went into the red en masse.

Now this is very elementary and not all executives would fall into what seems so obvious an error. Nevertheless, similar mistakes in lesser degree are made by the great majority of executives owing to the fact that the conventional profit and loss statement, and its breakdowns, do not disclose facts which an executive needs to be able to arrive at correct judgments regarding what is profitable action and what is not.

How often, for instance, have manufacturers abandoned lines of product which according to profit and loss statement analyses were "unprofitable?" In the great majority of such cases the discarded lines, like the unfortunate discharged salesmen, had been carrying fixed charges in excess of the losses shown, with the result that dropping these lines meant that these fixed charges were required to be absorbed in the costs of those remaining. I

cannot remember a single case in my own experience where a manufacturer did not lose money by abandoning an "unprofitable" line, except when the dropped line was absorbing manufacturing capacity which could be immediately diverted to the manufacture of relatively more profitable products.

The Practical Economist's Profit and Loss Statement

The Practical Economist's Profit and Loss Statement, which appears at the right of the conventional form on Exhibit 2, supplies the essential missing data. In a particular company, costs do tend to rise in a certain pattern with sales. The technique exemplified earlier in this paper, applied to a company's situation, will serve to obtain a breakdown of the conventional figures into the categories shown in the practical economist's statement. We will assume this done and turn our attention to the significant grouping of costs in the latter. These figures have eliminated the primary shortcoming of our conventional profit and loss statement, namely its lack of separation as between fixed and variable costs and expenses, with the result that we secure three new figures of very great interest and value, namely, *Marginal Balance*, *Variable Selling Expenses*, and *Net Marginal Balance*.

Marginal balance is a direct index of the profit value of increased sales volume secured without any increase in variable selling costs, as from a house account. Variable selling expense includes such items as cost of salesmen, warehousing expenses, and all types of advertising but not such items as salaries of branch sales managers and branch office rentals and expenses. Net marginal balance represents the marginal balance less variable selling expenses and its ratio to net sales is an indicator of the profit value of increased sales secured at additional selling expense per dollar of sales equal to that being currently expended.

Also readily available from the practical economist's profit and loss statement but not from the conventional type, are the means for computing the breaking point of operations in terms of sales volume. By well-known formula, this is:

$$\text{Breaking point} = \frac{\text{Fixed charges}}{\text{Net marginal balance per cent of sales}}$$

or, on the figures shown:

$$\text{Breaking point} = \frac{\$547{,}374}{.32366} = \$1{,}691{,}189$$

Profit Pattern and Pattern Revisions

A more important matter to the process of planning is the recognition in the practical economist's statement of the materials for the current profit pattern and profit pattern revisions. These are worked in Exhibit 2 in columnar form and also plotted thereon from the three figures keyed in each case. The points represented by these figures necessarily all fall on the profit line which, under the practical assumption of constant variability, is a straight line.

The current profit pattern shows very clearly what the profit would be under current conditions at any point of sales volume. Assume for instance, that sales were increased to five million dollars and that the increase in sales were secured by additional selling expense representing the current variable selling expense ratio to net sales of 10.381 per cent. Using a measurement scale on the chart shows that under these conditions the operating profit would be roughly $1,070,000. Figuring it precisely we get the following:

Net sales	$5,000,000	
Net marginal balance:		
32.366 per cent of $5,000,000		$1,618,300
Less fixed charges		547,374
Operating profit		$1,070,926

But supposing our sales manager figures out that he could sell a million dollars worth of additional goods by reducing the selling price 10 per cent and at a selling expense of 7½ per cent on the reduced selling price as a sales commission. How would we come out on that one?

Well, on the additional million dollars worth of goods sold (the selling price of which would be $900,000 because of the price reduction) our marginal balance would be 42.747 per cent of $1,000,000 less the price redution of $100,000 or $327,470. From this we will have to take 7½ per cent of our $900,000 giving us an increase in operating profit of $249,970 made up as follows:

Marginal balance on increased sales volume.....	$327,470
Less sales commission—7½ per cent of $900,000.	67,500
Increase operating profit.....	$259,970

Try and play a simple little tune like that on your conventional accounting piano!

Solving Practical Problems

When a profit and loss statement follows the general plan of that which I have called the practical economist's profit and loss statement, namely, when it provides for an accurate breakdown of costs and expenses as between fixed and variable elements, it is possible to make computations with speed and accuracy which could not be done from the information obtainable from the conventional profit and loss statement. We may take three typical questions to illustrate this:

1. How much will our profits be reduced on our current sales volume of $3,988,519 if we increase labor rates 12.5 per cent, if we spend $50,000 more for fixed charges, and if we calculate that we will have to meet increased prices of 18.3 per cent on our raw materials?
2. Having figured out the above, how much would we have to increase our own selling prices to make as much money at the higher costs as we would have made if the current labor rates and material prices remained in force?
3. How much would we have to sell at the old selling prices but with the new labor rates and material prices in order to realize the same operating profit as before, namely $743,559?

The first question is all worked out on the practical economist's profit and loss statement and the answer, namely, an operating profit of $361,104. The answer to the second question is also shown in the total of the pattern revisions, namely, $382,445.

The third question we can answer with approximate accuracy directly on the chart by drawing a dotted line as has been done and roughly scaling the sales figure at $5,600,000. More accurately by simple mathematics we get the following:

1. Revised marginal balance rate: $\frac{\$976,609}{\$3,988,519} = 24.485505\%$

2. Amount of net marginal balance required to equal operating profit on current pattern of $743,559:

Operating profit—current pattern.....	$ 743,559
Add fixed charges—revised pattern	615,606
Net marginal balance required (2).....	$1,359,165

3. Net sales required to give above net marginal balance at revised marginal balance rate:

$$\frac{1,359,165}{.24485505} = \$5,550,896$$

I have illustrated only the general approach to the building up of a profit pattern and the projecting of revised profit patterns. Enough has been shown, however, to indicate that in such a pattern we have the foundation of all manner of projections. Their name is legion. A branch manager who has been taught to think in marginal balance terms will want to figure regarding the possibilities of increasing the profit contributions of his branch by more intensive selling, that is, by reducing the size of the individual territories. In this connection a profit pattern built upon marginal balance lines gives the answer. Generally speaking, the answer can be secured to any combination of suggested changes in the variety of the goods sold, in selling and advertising expense, in the number of salesmen, in manufacturing costs, and so on. And what is the purpose of all this? Well, I quote from our distinguished American educator and writer, Will Durant, when he said:

> "We strive to learn the forms of things not for the sake of the forms but because by knowing the forms we may remake things in the image of our desire."

How Are We Doing in Terms of the Planned Profit Pattern?

Operating a business is in many respects similar to the navigation of a ship. First, the navigator sets his course, the equivalent of which for the businessman is the building up of a profit pattern, and second, the constant checking of the actual position of the ship takes place, or of the business, in relation to the planned

PROFIT PATTERN
AND
"SEMAPHORE" STATEMENT
NET SALES MILLIONS OF DOLLARS
PROFIT BEFORE FIXED CHARGES THOUSANDS OF DOLLARS
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
"SEMAPHORE" STATEMENT
Year 1946
NET SALES
PROFIT BEFORE FIXED CHARGES
RATE OF PROFIT
PATTERN
ACTUAL
VARIATION
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

EXHIBIT 3

course. In this connection we can learn much from the late John H. Patterson, founder of the National Cash Register Company and one of the most remarkable businessmen who ever lived. Mr. Patterson was a great exponent of the idea of what he called "teaching through the eye" by means of pictures. He was convinced that one of the greatest wastes in industry is the time spent, often fruitlessly, by the valuable men, the presidents and other high-ranking executives, in figure study. Regarding this, Samuel Crowther relates in his biography of Mr. Patterson:

> "He was appalled by great reports. *He wanted an accountant who could tell him all about the business in a couple of lines.*" (Italics supplied)

In Exhibit 3, it seems to me, we approach Mr. Patterson's desire for something which would tell him the essential facts regarding a business with the minimum expenditure of executive time and effort.

Two sets of key figures are plotted, first the *planned* cumulative sales and profit figures up to the end of each month, as indicated by the small white circles, and, second, the *actual* cumulative sales and profit figures, these being indicated by the black circles. Incidentally, if Mr. Patterson had been furnished with this type of chart, I feel quite certain that, if the relation of the white circles to the black ones showed that both sales and profits were better than planned, he would have been quite satisfied not to look at another chart or figure until the relationship had changed for the worse.

It will be noted that the plotted information on Exhibit 3 is supported by a summarized statement in figures. Figures and charts can with profit be studied together. Note particularly the small circles beside each figure—the "semaphores." When these are not filled in they represent green lights—we are doing better than plan, so full steam ahead. When they are filled in, they represent red warning lights—we have fallen behind our program—trouble to be investigated and corrected. The situation to the end of May, it will be noted, is all to the good. All of our three semaphores are green:

1. Sales are ahead of program $148,000
2. Profits are ahead ..... $ 64,130
3. Rate of profit is ahead to the amount of ..... $ 27,862

Getting the Whole Picture

The structure of a modern business is as complex as that of a modern automobile and the executive or accountant who believes that he can understand this structure fully with the aid of figures alone would be like an automotive engineer who believed that he could design an automotive engine solely by means of figures and without a single sketch or drawing.

No businessman understands his business fully unless he is familiar with his whole profit pattern, not part of it. The man who thinks primarily in terms of sales or of costs or of expense savings or of selling costs per dollar of sales does not know his business. He cannot fail to lack perspective. Unless all of these factors can be seen in their respective relationships to the ultimate objective of the business, namely, the realization of its full profit possibilities, we cannot help having a partial, which means a distorted, view of the picture.

The "bundle of habits" which time has created in a business is the material with which the man who wishes to make a business more successful has to work. His task is to change existing habit patterns affecting the prosperity of the business into definite patterns of accomplishment. This is the only way in which a business, any business, can make real progress profitwise and this procedure is what I have called practical economics.

COMING ARTICLES

In the *N. A. C. A. Bulletin*, January 1, 1949

The Dilemma About Profits—Adjusting the Statements to Base Year Dollars
by James A. Heffner

Control Uses of Standard Costs in a Steel Mill
by M. D. Wells, W. P. Marquis, and J. H. Elliott

Keying the Sales Budget to Customer Buying Needs
by D. E. Merrifield

An Internal Audit Program to Serve Management
by Dennis J. O'Connell

Field Warehousing Under Production Department Control
by Richard J. Halloran

DETERMINATION OF "LIFO" INVENTORY VALUATION UNDER THE RETAIL INVENTORY METHOD

by LEON M. NAD,
Instructor in Accounting,
Wharton School of Finance and Commerce,
Philadelphia, Pa.

ONE of the better known provisions of the Internal Revenue Code is Section 22(d) (1) which permits taxpayers to price their inventories under the last-in, first-out method. The regulations now acknowledge the applicability of this basis to department store inventories where the so-called retail method of valuation is used. Where goods are valued under this "elective" basis, the taxpayer is required to:

> "(A) Inventory them at cost;
> (B) Treat those remaining on hand at the close of the taxable year as being: First, those included in the opening inventory of the taxable year (in the order of acquisition) to the extent thereof, and second, those acquired in the taxable year."

To explain how the requirements of paragraph (B) of Section 22(d) (1) of the Code are met in the retail field requires an explanation of the use made of price index data. An understanding of the way in which paragraph (A) is complied with requires a knowledge of net mark-on computation as it is required to be modified from commercial practice so that cost rather than the lower of cost or market will be reflected in the valuation reached.

Inventory Records of the Department Store

A manufacturer finds it relatively easy to apply the "lifo" principle to inventory pricing. A department store, however, does not maintain its inventory records in terms of specific items of merchandise and the costs attached to the various transactions affecting every article. The number of items carried and the multitude of transactions affecting each item makes this impracticable. Inventory data in the retail field are accumulated in such a manner as to show the dollar investment in the inventory of each department of the store. Retail inventory accounting shows how much the total dollar investment is in each department. There is no attempt to maintain a record, in both dollar and physical quantity terms, of the transactions affecting each inventory item in the store or the department. Instead of accounting for units of mer-

chandise, the retail records of inventory account for monetary investment in department inventories without identification of merchandise attaching to portions of this monetary amount.

Getting at Quantity Change: Use of Price Indices

During 1941 a group of retail accountants associated with the Controllers' Congress devised a method of overcoming this obstacle to the use of last-in, first-out. These accountants wished to have a scheme that could be adapted to the traditional system of retail inventory accounting and produce inventory valuations substantially similar to those that would be secured if the "lifo" scheme of pricing were used in connection with specific identification of the articles in the store. Their thoughts centered about the adjustment of retail inventories for price changes.

Under the retail inventory method the value at retail selling prices of a departmental inventory as a whole is known at every balance-sheet date. *If prices have remained constant between two inventory dates,* an increase in the retail value of a departmental inventory between these dates may properly be considered to indicate that a commensurate increase in the physical size of the department's inventory has taken place. It would then be possible to treat the ending inventory as being composed of two parts: (1) that part represented by investment in stock presumed to have been included in the opening inventory; (2) that part represented by investment in stock purchased during the year. The complement of the percentage of mark-on in the opening inventory would be applied to the first part to determine the cost equivalent of that part, while the application of the complement of the mark-on percentage for the year's purchases to the second part would give its cost equivalent. Addition of the two cost equivalents would produce the inventory valuation desired.

Similarly, where prices have not changed between the two inventory dates, a lesser retail value at the close of the year would be presumed to indicate a decline in the physical size of the department's inventory. The conclusion drawn, then, would be that the investment in merchandise at the second date is equivalent to but a portion of the investment in stock at the first date, and the complement of the mark-on percentage in the opening inventory may be applied to the retail value of the closing inventory.

The reader will notice that these assumptions hold good only when prices between two inventory dates remain constant. As a

matter of fact, changes in the price level are always taking place. For this reason, changes in the value at retail of a departmental inventory do not measure corresponding changes in the physical size of the departmental stock. If one wishes to determine the increase or decrease in the physical size of the inventory during a given year, an adjustment must be made for price fluctuations that have occurred during that year. A comparison of the dollar values at retail of the two inventories cannot, in itself, give certain indication of the increase or decrease in the physical size of the inventory of the department. Because the dollars represent purchasing power of the monetary unit at the beginning and end of the year, the raw retail figures must be adjusted to the same basis by application of price index numbers appropriate to the particular department at the respective dates.

Some Illustrative Figures

If an inventory of 10,000 washers was on hand in a manufacturing company at the end of the year and only 8,000 washers were in stock at the beginning, it is certain that the physical stock of washers has increased 25 per cent. But if a retail store department inventory increased from $8,000 to $10,000 between January 31, 1947, and January 31, 1948, it cannot be surmised that the physical size of the stock has increased 25 per cent, for price changes may have occurred in the meantime. If the price level has gone up 25 per cent, $10,000 in 1948 will buy no more than $8,000 in 1947. Under such conditions the increase in a departmental inventory from $8,000 to $10,000 would indicate that no increase in the physical size of the inventory had taken place. If prices rose 33⅓ per cent, a $10,000 inventory at January 31, 1948, would be the equivalent of a $7,500 inventory one year earlier, and would reflect a 6.25 per cent decline in quantity.

Thus, by applying indices of price changes to the retail inventory figures, the department store accountants were enabled to arrive at a method that permitted them to determine reasonably well the physical increase or decrease of a departmental inventory during a given fiscal year, even though they were still unable to determine the status of individual articles as between two inventory dates. On this basis, they hoped to apply last-in, first-out for tax purposes. Many stores adopted this method for the first time for the fiscal year ended January 31, 1942. For this reason, the illustrations following later will use this date as the starting point.

The Hutzler Case

Nevertheless, the Bureau of Internal Revenue held that last-in, first-out was meant to be applied only where specific identification of individual and separate articles is possible. In a test case, however, *Hutzler v. Commissioner* (8TC 14), the Tax Court refused to sustain the Commissioner's contentions. The Court pointed out that the Revenue Act of 1939 permits all taxpayers required to inventory goods to use the elective system. It further held that the price index device, while it involves computations that are rather complex, is a logical procedure for determining the relative size of inventories at two different dates for purposes of applying Section 22(d)(1) of the Code. Moreover, the Court rejected the idea that specific identification of individual items is necessary for application of "lifo." Since retail accounting keeps inventory records in terms of dollars, department stores should be allowed to keep their dollar investment in terms of base year prices just as a manufacturer is allowed by the elective method to continue to price his base year stock at prices prevailing in that year. In this connection the Court cited the Code's acceptance of the retail method, itself, as an example of approval of an inventory pricing scheme that does not involve specific identification of articles.

Price Indices Under the Tax Regulations

This being so, the question of what price index or indices to use becomes of major importance. Obviously, some price index must be constructed to measure changes in the purchasing power of the inventory investment of the department store. But how is such an index to be constructed? Who is to determine what changes in the value of the inventory dollar have occurred between two inventory dates? At first the department stores using "lifo" considered that each store would prepare its own indices of price changes for each of its departments on the last-in, first-out basis. Later, more general but still unofficial indices were used. The Hutzler case, however, indicates that more adequate data for the computation of indices are needed, in the view of the Bureau of Internal Revenue. In acquiescing in the Hutzler decision, the Bureau refused to accept the index numbers used. Section 29.22 (d)-1 of the income tax regulations now states:

> "If a taxpayer using the retail method of pricing inventories, authorized by section 29.22(c)-8, elects to use in con-

nection therewith the elective inventory method authorized by section 22(d) of the Code, the apparent cost of the goods on hand at the end of the year, determined pursuant to section 29.22(c)-8, shall be adjusted to the extent of price changes therein taking place subsequent to the close of the preceding taxable year. The amount of any apparent inventory increase or decrease to be eliminated in this adjustment shall be determined by reference to acceptable price indices established to the satisfaction of the Commissioner. Price indices prepared by the United States Bureau of Labor Statistics which are applicable to the goods in question will be considered acceptable to the Commissioner. Price indices which are based upon inadequate records, or which are not subject to complete and detailed audit within the Bureau, will not be approved."

While the use of the price indices developed by the Bureau of Labor Statistics is not compulsory, the majority of stores will in all probability use them, since the construction of indices by each store, based upon its own retail prices, is expensive. Indices have not been prepared for each department but instead for groups of related departments. The indices constructed are:

I. Piece goods, domestics, and draperies
II. Shoes
III. Ladies' underwear
IV. Ladies' outerwear and girls' wear
V. Men's and boys' wear
VI. Furniture and bedding
VII. Home furnishings
VIII. Major appliances and electrical goods
IX. Notions and toilet articles

In addition to these nine group indices, three special composite indices were prepared:

1. Piece goods, apparel, and notions (Groups I, II, III, IV, V, and IX)
2. Furniture, home furnishings, and appliances (VI, VII, and VIII)
3. Store total

The use of these indices is explained by Mimeograph 6244, dated March 9, 1948:

> "In using such group indices, a department store taxpayer will apply to the inventory data for each of his departments separately . . . the index for the group in which the department logically belongs. A given group index may be applicable to a number of departments in a store."

Mimeograph 6244 continues with the statement that when a department does not fit into any one of the nine groups,

> "an index should be employed which represents an average for the whole of the remainder of the store. For example, this index may be the Store Total, as shown by the Bureau of Labor Statistics or that shown for Apparel, Piece Goods and Notions combined (Groups I, II, III, IV, V, and IX), whichever of these combinations more closely represents the coverage of the inventory stock carried by the store."

The Bureau of Labor Statistics, in a release dated February 3, 1948, has presented a list of the departments belonging to each of the nine groups mentioned above. The departments used are the same as those used by the Controllers' Congress of the National Retail Dry Goods Association. No index was prepared to cover departments handling books and stationery, neckwear, handkerchiefs, women's and children's gloves, toys and games, sporting goods, photographic equipment, or luggage. Moreover, data for food, candy, liquor, tobacco, paint, and contract departments were excluded from all computations.

The indices are prepared semiannually and use prices prevailing on the fifteenth of January and the fifteenth of July in each year. An index prepared as of either of these dates may be used for inventories taken at the beginning or end of the month in which the index is taken. Thus, an index prepared for January 15 is used by all companies on a calendar-year basis or on a fiscal year ending January 31. The July 15 index serves all stores with fiscal closings on either June 30 or July 1. By far the greatest number of department stores do close their books on one of these four dates, with January 31 and December 31 probably the two leading dates for closing. One more index may be provided.

Cost—Not Cost or Market

Thus it is recognized that through use of price indices, the requirements of paragraph (B) of Code Section 22(d) (1) can be met, i.e. we can tell how much of the inventory was on hand at an earlier date, even though we have only departmental dollar

totals to work with. The requirement of paragraph (A) that "lifo" inventories must be at cost (not cost or market) calls for a modification of the regular retail inventory method formula. This aims at the lower of cost or market and the complement of the full mark-on percentage is applied to the retail value to obtain the inventory figure although markdowns (less markdown cancellations) have reduced the retail figure below cost plus mark-on. To obtain an inventory figure at cost which will ignore the market factor, the complement of a mark-on percentage which has first been reduced by net markdowns of the period must be applied to the inventory at retail. This procedure will be noted in the next section of this paper where the method of ascertaining the inventory at cost at the beginning of the first year for which "lifo" is to be used, is followed through.

Initiating Use of "Lifo" Basis

To start the "lifo" system, it is first necessary to convert to cost the opening inventory of the fiscal year in which the method is first used and incidentally to adjust tax computation for the preceding year. This means, in our illustrative case, that the January 31, 1941, inventory must be stated at cost rather than at the lower of cost or market. A look at Exhibit 1 will show that we plan to carry hypothetical figures and index readings forward from the foregoing date. We will assume a hypothetical company with figures relating to the shoe department, which falls in the men's and boys' clothing index group.

Under the retail inventory system the January 31, 1941, inventory would be priced at $15,258 on the detailed figures given below, assuming an inventory at January 31, 1940, of $13,000 at cost and $20,000 at retail. This result comes from computing the mark-on without considering the $3,000 noted as "markdowns, less cancellations." This, however, is stating the inventory at the lower of cost or market, whereas the tax requirements are that "in determining income for the taxable year preceding the taxable year in which such 'lifo' method is first used, the closing inventory of such preceding year . . . shall be at cost." We have assumed a price index of 100 at this date, reserving illustration of price index adjustment for the subsequent situations shown in Exhibit 1. To calculate the inventory at January 31, 1941, at cost would involve including markdowns in the computation of the mark-on percentage, as shown in the table on page 465:

ILLUSTRATIVE COMPUTATIONS OF "LIFO" COST OF RETAIL INVENTORIES

Situation Illustrated (See Notes)	Year Ended Jan. 31	Retail Value of Inventory	Standing of Price Index	Retail Value Adjusted to Jan. 31, 1941	Application of Jan. 31, 1941 Cost (Mark-on Complement 64.844%)		Application of Jan. 31, 1942 Cost (Mark-on Complement 62.252%)			Total "Lifo" Cost
							Retail Value			
					Retail Value	Cost	Adjusted to Jan. 31, 1941	Adjusted to Jan. 31, 1942	Cost	
1.	1941	$24,000	100	$24,000	$24,000	$15,563	—	—	—	$15,563
2.	1942	32,000	114.29	28,000	24,000	15,563	$4,000	$4,571	$2,846	18,409
3.	(1942	32,000	80	40,000	24,000	15,563	16,000	12,800	7,968	23,531)
4.	1943	36,000	133.33	27,000	24,000	15,563	3,000	3,428	2,134	17,697
5.	(1943	29,700	110	27,000	24,000	15,563	3,000	3,428	2,134	17,697)
6.	1944	37,500	150	25,000	24,000	15,563	1,000	1,143	712	16,275
7.	1945	32,000	160	20,000	20,000	12,969	—	—	—	12,969

The above data are given cumulatively from year to year except that the two lines enclosed in parentheses represent alternative assumptions with respect to the price index and, in the second instance, inventory retail value for the year in question. The data in these two lines do not affect figures for subsequent years in the above illustrations.

Notes:

1. Opening inventory of first "lifo" year.
2. Price and quantity increases.
3. Price decrease and quantity increase.
4. Price increase and quantity decrease.
5. Price and quantity decrease.
6. Price increase, and quantity decrease below two previous years but not below first lifo inventory.
7. Price increase and quantity decrease below first "lifo" inventory.

EXHIBIT 1

	Cost	*Retail*	*Mark-on*	*M. O.%*
Purchases	$80,000	$130,000.	$50,000	
Freight	3,000		3,000*	
Additional mark-ups (less cancellations)..		1,000	1,000	
Mark-downs (less cancellations		3,000*	3,000*	
	$83,000	$128,000	$45,000	35.156%
Inventory, January 31, 1941, Retail		$ 24,000		
Inventory, January 31, 1941, Cost (.64844 x $24,000)	$15,563			

The taxable income of the store for the fiscal year ended January 31, 1941, would be increased $305 ($15,563-$15,258, as a result of this recalculation and the "lifo" base inventory (opening inventory, year ended January 31, 1942) recorded at the larger figure. It may be mentioned at this point that, in computing "lifo" mark-on for periods subsequent to the opening date, the form is the same as above, for it is the mark-on representative of each successive year's purchases that is sought.

Specific Situations

By reference to Exhibit 1, it will be noted that the retail value of the inventory remained above $24,000, as might be expected, in all years and cases shown and that, by application of the price index, its adjusted value representing quantity likewise exceeded that of the opening "lifo" inventory until the end of 1945. Hence, until that date, the inventory on the "lifo" basis continued to contain the opening inventory at cost (retail value times mark-on complement) of $15,563. At that date, only $12,969 of the initial "lifo" inventory remained and it is important to remember that in succeeding years no greater amount can be carried at January 31, 1941, cost. Part of the original "lifo" inventory has been sold.

In the years which intervened between January 31, 1941, and January 31, 1945, it was necessary to value increased stock at cost subsequent to the initial date. On our data, 1942 costs served for this throughout because the inventory never grew *in quantity* beyond the increase represented by the figures at January 31, 1942. In fact, regarding only the cumulative lines on Exhibit 1, the 1942 quantity increase (shown at January 31, 1941 adjusted retail of $4,000, then at January 31, 1942 adjusted retail of $4,571, then

at 1942 cost equivalent of $2,846) was gradually sold out. As with the impairment of the base inventory during 1945, it is important to realize that these impairments of the 1942 increase could never be restored at 1942 cost. Increase beyond the remaining 1942 quantity in a year subsequent to the decrease would call for valuing a portion of the inventory at still later costs.

The data in Exhibit 1 recognizes six situations as noted below the tabulation. Situation 2, with prices and quantities going up, has been the most common postwar situation and has resulted in use of cost later than the base inventory for at least some portion of the valuation. Situation 3—price decrease with quantity increase—is illustrated for coverage as it is occasionally being encountered now. Situation 4 is likewise a familar one. While prices have continued upward, the levels of departmental quantities have naturally often been reduced for one reason or another. Situation 5 is somewhat special—both quantity and price decrease from the previous level—but is a natural situation in normal operations. Situations 6 and 7 stress the impairment of previous base or early year quantities, mentioned before, which occurs when quantities have dropped so low that they are less than initial years of "lifo" application or, as in Situation 7, even lower than the first inventory at cost with which "lifo" was started. These situations call for especial vigilance for they deprive the company forever of the right to price this portion of the inventory at early costs.

Conclusion

Of course there are other situations. Moreover, there are other aspects of the "lifo" basis not treated here. One of these is the matter of inventory reserve. The initial "lifo" inventory at cost will exceed the regular retail inventory at cost or market at that date, but later "lifo" inventories, while inflation lasts, are almost sure to be lower than that produced by the regular operation of the retail method of valuation and to call for maintenance of a reserve of the difference between the two results. Looking in another direction, the mere use of index technique to eliminate an inflationary effect on accounts may stir interest. However, the main purpose of this paper has been to work out in terms of readily understandable data the practical application of the "lifo" basis of inventory valuation in the situations most likely to be encountered now in the management of a retail inventory.

ALLOCATING ROADHAUL COSTS TO TERMINALS FOR A COMMON MOTOR FREIGHT CARRIER

by M. C. SPAAN,
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THE motor freight industry is young—and growing. Its accounting is geared to the requirements of the Interstate Commerce Commission, but its problems naturally extend well beyond those of simple reporting, to the orderly determination of results of operations. The commission recognizes three primary classes of motor carriers: common carrier, limited common carrier, and contract carrier. This paper deals with a cost allocation problem as faced and solved by one common motor freight carrier, the official definition for which is "a carrier of general merchandise between specified points on certified routes." We operate, and operate between, fifty terminals in seventeen states.

The problem arises in the preparation of terminal profit and loss statements. Tabulation of freight bills readily affords detail of revenue by origin and destination and its equal division between these terminals presents no special problem. Likewise, a quick picture of principal cost items will indicate that many are separately incurred by or for each terminal. Principal operating costs are:

Transportation expense	*Terminal expense*	*Miscellaneous*
Roadhaul	Terminal salaries	Claims
Cartage	Light, heat, power, water	Other
Dock wages	Repairs	
Dock expense	Rent	
	Communication	
	Office supplies	

The Problem of Truck Hire Costs

Terminal expense does not suggest an allocation problem. Under transportation expense, cartage is local pickup and delivery and the dock captions refer to handling costs in and out of the trucks. Dock wages, cartage costs, and sundry terminal expenses consume some thirty cents of the revenue dollar and are readily assigned to the terminals which incur them. The villain of the piece is roadhaul or, in our case, truck hire, cost. These consume about half of the revenue dollar and do not "speak for themselves" when proper allocation to terminals is desired.

TRIP RECORD NO. 370921

TRACTORS					DO NOT WRITE IN THIS COLUMN		
	TRACTOR NO / OPERATOR	DRIVER	D.H. MILES	LOADED MI.	MILES	RATE	AMOUNT
1	100 / A			220	220	.13	28.60
	FROM: Indianapolis	TO: Toledo					
2	200 / B			306	306	.13	39.78
	FROM: Toledo	TO: Buffalo					
3	TRACTOR NO / OPERATOR						
	DRIVER		D.H. MILES	LOADED MI			
	FROM	TO					

TRAILER						
TRAILER NO	OWNER	MILES				
8000	Truck Rentals	526				
FROM: Indianapolis	VIA: Toledo	TO: Buffalo	526	.03	15.78	

WAYBILLS					TOTAL COST	84.16
	NUMBER	FROM	TO	WEIGHT		
1	81426	Indpls	Buf	12082		
2	81427	Indpls	Tol	7248	TOTAL WEIGHT	27,859
3	51850	Tol	Buf	8529		
4						
5						
6						

EXHIBIT 1

As outlays, they are rather concisely handled in our setup. We hire the trailers from a subsidiary at a stated rate per mile and we hire from outside individuals the tractors which pull them, and likewise pay a fixed rate per mile on standard mileage between points. These payments take the place of the wide variety of detailed expense which would otherwise go into the roadhaul total, including drivers' wages, garage costs, truck depreciation, etc., etc. We are able to handle this category of costs (for primary accumulation) as shown in Exhibit 1, Trip Record, which records the

cost to us of a trailer run, including the cost of two tractors which pulled the trailer on successive legs of the trip. The problem is to allocate the amount of $84.16—along with the hundreds of items like it that go to make up the aggregate of roadhaul costs—among the terminals in, at least approximately, the proportion that related freight revenue is credited to them. As will be seen, the weight figure, appearing on Exhibit 1 below the cost figure and permitting computation of trip cost per hundredweight, is made use of in the procedure to be outlined.

But why the problem? Well, if trip costs were split equally between origin and destination terminals of the trailer, the cost allocation would have slight relationship to the revenue credit. The end points of the trailer trip are only in part those of the freight carried, which might conceivably relate to eight, ten, or even a dozen terminals, to which revenue credit would go.

Distinguishing Between Direct and Transferred Freight

Our method of making the cost allocations involves making also some assumptions which will be apparent as we go along, but the procedure does effect absorption of tractor and trailer hire costs each period with minor variance and no indications of inequities among terminals. Our first step is to tabulate weight of freight carried on the same basis as revenue is credited, distinguishing between weight carried on direct trailer runs between the revenue points and weight transferred at some intermediate point. This results in the Truck Cost Work Sheet, Exhibit 2, for each period. From its revenue work on freight bills, the tabulating department already has the weight between each point without, however, making a distinction between transferred and direct freight. For the purpose of Exhibit 2, this department processes waybills which have been coded in the cost department to identify origin, destination, and transfer point on freight weights transferred. These transfer figures are summarized and posted in the quantity space on the work sheet at the junction of horizontal and vertical columns representing the end points of the shipment, and are marked with the transfer point. The excess of the weight shipped between these two points over transferred weight, according to the revenue tabulation, is posted to the same space as direct freight.

Costing the Weight Carried Between Specific Points

Thus we have a simple summary of the period's revenue freight in terms of weight by origin and destination, with freight trans-

TRUCK COST WORK SHEET

	BUFFALO	GRAND RAPIDS	INDIANAPOLIS	RUTHERFORD	TOLEDO
BUFFALO		142,500 4,300 TOL	257,600	143,700 9,846 BU	63,100
GRAND RAPIDS	23,600 101,600TOL		43,300	93,900TO BU	101,900 16,300DET
INDIANAPOLIS	321,400	24,700		400,000 100,000 TO	2818.00 726.00 104,500
RUTHERFORD	234,400	279,100 41,400 BU	59,600		
TOLEDO	52,300	198,600	188,300	80,000 97,300 BU	

EXHIBIT 2

ferred en route separately set out by point of transfer. It remains to cost these figures in the adjoining columns on the work sheet and to divide the charge equally between origin and destination terminals. In this costing process, the trip record comes in again and a reference at this point to Exhibit 1 may be helpful. It shows the cost of a trip from Indianapolis to Buffalo and the cost per hundredweight of freight carried is readily determinable from the data provided. All such trips for the period, and the same is true of all other trailer trips between identical terminals, are combined and a cost per hundredweight for the run for the period is derived and set forth as on the Run Cost Rate Chart, Exhibit 3 (data is shown to the nearest tenth of a cent). The unit costs on this table are then applied to the freight carried within the period as it shows on Exhibit 2.

It will be noted from the Truck Cost Work Sheet that 400,000 pounds moved directly between Indianapolis and Rutherford and 100,000 pounds between the same end points by transfer at Toledo. Reference to the

Run Cost Rate Chart provides the figure of 70.4 cents per hundredweight for the direct movement and, therefore, for extension of 400,000 pounds, giving a cost of $2,816 as posted on Exhibit 2. The chart also shows that the hundredweight cost for the Indianapolis to Toledo run is 20.5 cents and for the Toledo to Rutherford run is 52.1 cents which, combined, give a hundredweight cost of 72.6 cents for application to the figure of 100,000 pounds, resulting in the posted amount of $726. The two items of cost aggregate $3,542, which is charged in equal parts to the Indianapolis and Rutherford terminals. And correspondingly for all the other money blocks on Exhibit 2, relating to other tereminals.

RUN COST RATE CHART

	B.C.	BUF	DET	FT.W	G.R.	IND	PHIL	RUTH	TOL
BATTLE CREEK		415	145			344	639	988	176
BUFFALO			303	393	370	377		349	252
DETROIT	184	349		167	166	278	574	649	075
FT. WAYNE		316	155		153		603	640	
GRAND RAPIDS	116	439	172	209		311	659	974	205
INDIANAPOLIS	209	331	225	119	235		566	704	205
PHILADELPHIA		355	599	589	633	602			
RUTHERFORD		359	568		684				488
TOLEDO		304	050		196	184		521	

EXHIBIT 3

A Practical Degree of Accuracy Achieved

The foregoing is of necessity only an outline of the principles involved in developing a distribution of roadhaul costs. As stated in the beginning, the problem is one of fairly allocating the over-the-road cost back to the terminal, which is the cost center. We have found over a period of years that the system works out satisfactorily to such an extent that on a book figure which has increased from $200,000 to $600,000 of truck hire cost per period, the average adjustment from the work sheets remains about three per cent. We do find it necessary to work new unit run costs each period if the method is to achieve the desired distribution of the period's cost within the tolerance indicated. There is a wide variation from period to period in the volume of tonnage hauled on the various runs and in the average weight per load on these runs, markedly affecting the cost per hundredweight.

N.A.C.A. BULLETIN

Section Three

RESEARCH SERIES NO. 15

A STANDARD COST CASE STUDY

VOL. XXX, NO. 8 DECEMBER 15, 1948

Contents

The Company and Its Product
Uses of Standards
Setting Standard Costs
Material and Labor Cost Standards
Overhead Cost Standards
Cost Control—Material Costs
Cost Control—Direct Labor
Cost Control—Overhead
Cost Control—Selling, Administrative, and Other Expenses
Reporting Cost Information to Management
Use of Standards in Accounting for Costs
Relationship Between Budgets and Standards
Conclusion

FOREWORD

This report is the last in a series of five which together present the conclusions from a research project covering modern practice in the use of standard costs. Previously published studies in the series are: "A Reexamination of Standard Costs," *N. A. C. A. Bulletin,* February 1, 1948; "Standards to Aid Control of Manufacturing Costs," *N. A. C. A. Bulletin,* March 15, 1948; "Standard Costs for Costing Inventories," *N. A. C. A. Bulletin,* June 1, 1948; and "Standard Manufacturing Costs for Pricing and Budgeting," *N. A. C. A. Bulletin,* October 1, 1948.

These studies have shown that the principal uses of standard costs are aiding management in cost control, costing of production and inventories, and estimating costs for pricing and budgeting. In concluding each field interview, questions were asked for the purpose of discovering the extent to which standard costs are serviceable for each of these uses. Replies were obtained from 66 companies and are summarized below for each of the uses made of standard manufacturing costs.

1. *Cost control.* All but one of the 66 companies regard their standard costs as aids to cost control, although there are three companies which consider cost control to be a minor use for their standard costs. Most of the difficulties reported in the use of standard costs for control appear to stem from failure to keep standards up to date, from plans which are not designed to produce the kind of data needed for control, and from failure of management to understand and use the standard costs.
2. *Bookkeeping economy.* Standard costs were stated to have distinct advantages in facilitating bookkeeping by 60 of the 66 companies. The remaining six companies have standard costs primarily for purposes of pricing or cost control and either do not enter standard costs in the accounts or limit the use of standard costs in the accounts to standard overhead rates.
3. *Costing inventories.* Standard costs are used by 60 of the 66 companies for this purpose. Difficulties in setting material price standards were reported to be the principal limitation to use of standard costs for inventory costing.

While a few companies view standard costs as unacceptable for this purpose, there were also several companies which stated that they would find it impossible to use any other inventory costing plan without an excessively large expense for accounting.

4. *Budgeting.* A substantial portion of the companies interviewed either have no budget or prepare only a summary budget which is not built up from detailed costs. This seems to explain the comparatively limited use of standard costs in budgeting, for all of the companies with complete budgets regard their standard costs as highly valuable in budgeting.

5. *Pricing.* Some of the companies interviewed apparently make little or no use of cost information in pricing. Many of the other companies adjust or revise their standard costs for current or anticipated conditions in preparing the costs which are supplied to pricing executives. The prevailing opinion seemed to be that the adjusted standard costs could be prepared more easily than actual costs. In several cases it was stated that through the use of standard costs, selective adjustments could be made to allow for factors which the company wished to recover in prices while eliminating other factors which were nonrecurrent or not recoverable under existing competitive conditions.

In conclusion, it appears that a number of the companies whose practices were studied have not realized the full potential which standard costs possess. On the other hand, there are companies which use their standard costs for a wide range of purposes and thereby gain the maximum in benefits from standard costs. This final study of the series presents a case study to illustrate how one company thus makes full use of its standard costs and how these uses are coordinated.

Acknowledgment is due to The Drybak Corporation for permission to use its standard cost plan as the basis for this case study and also to members of that company's staff for their assistance. The premilinary draft of this report was written by Professor Charles R. Scott, Jr. of Cornell University.

I. WAYNE KELLER, *Chairman,*
Committee on Research.

A STANDARD COST CASE STUDY

Previous studies in this series on standard costs have stressed the various uses of standard costs and have shown how standards serve each purpose. They have described the prevailing practice in the use of standard costs by the 72 companies which were interviewed in the field study. The manner in which the various uses of standard costs are coordinated and the desired information for each purpose is obtained from a single set of standards and cost records remains to be shown.

Identical procedures for this purpose are not applicable in all businesses and the approach to a coordinated use of standards must be made through methods which are adapted to the circumstances of the individual company. It seems that this aspect of the study of standard costs can be best presented in the form of a case study which shows how one company has accomplished such objectives. The methods of the company chosen for this case study are not necessarily the best possible, but they do provide an example of an operating system in which standard costs are used for all of the purposes of cost control, costing production, pricing, and budgeting. Furthermore, in this company management is provided with cost information which it finds highly valuable in directing activities of the business and this information is obtained at what it considers to be a reasonable expense for record keeping.

The Company and Its Product

This report presents the standard cost system of The Drybak Corporation, a company which manufactures a variety of trousers, coats, and vests for hunting, work, and other uses. Products manufactured by the company are approximately equally divided between those for stock and those made to order of the customer. They usually comprise from 200 to 250 separate articles at a given time. An important characteristic of the business is the continuously changing design of a diversified line of products. Individual production orders are comparatively small and many different orders are in process at a given time. For this reason the company uses a job lot plan of manufacturing. The company has one plant and normally operates with a force of 350 employees.

Uses of Standards

The company makes initial use of its standards for preparing price quotations. Subsequently, the same standards are employed for planning production in the factory, for controlling costs of manufacturing to facilitate accounting for costs, and in preparation of the annual budget. Cost of goods in inventory is stated at standard manufacturing cost.

The present costing plan using standard costs has been developed gradually over a period of 14 years. It replaced a previous system under which historical costs were accumulated by job orders. According to estimates of the company's treasurer, accounting expenses under the standard cost plan are substantially lower than they would be under the older plan. In addition, standard costs provide a wealth of information which management can use in operating the business. Much of this information would not be available at all without standard costs.

Setting Standard Costs

Requests for quotations and orders from customers specify the garment desired, its design and material, and the quantity of each size. If the item has not been manufactured before, a standard cost is set as a basis for a price quotation. These standard costs are developed from a careful analysis of the material required, labor operations to be performed, and the overhead applicable. While the garment desired usually differs in some respects from any made previously, operating characteristics of the equipment used are known. Likewise the combination and sequence of manufacturing operations required differ according to the specifications of the product, but these processes are widely used in many types of garment making. Consequently records of past experience and time study standards for the operations to be performed enable the company to set a reliable standard cost to use in pricing.

The cost changes for each change in garment size but the selling price is the same so the standard cost is based on an average size. Thus, coats ranging in size from 37 to 49 have a standard cost set on the average size which might be size 43. Variations in costs may occur on individual orders because of a heavier demand for larger or smaller sizes, but in the long run these variations even out.

COATS

MANUFACTURING DATA SHEET

LOT NO.

STYLE DESCRIPTION: Hunting
Regular corduroy

4 Buttons - setting on face

Plain shoulders

Rings adjustable - W/B and B Hole

2 Stitch down muff pockets

DATE

	PCS.	PATTERN NO.
COLLAR		4501
UNDER COLLAR		
FRONT		5016
FRONT FACING		
BACK		6091
SLEEVE		7350
POCKET		8540
POCKET		
POCKET		
POCKET		
FLAPS		
FLAPS		
FLAPS		
FLAP LINING		
FLAP LINING		
FLAP LINING		
CUFFS		
CUFF LINING		
SLEEVE LINING		
BODY LINING		
SHO. PADS		
SHELL LOOPS		
GAME PKT.		
ENT. FLAPS		
ENT. LININGS		

CUTTING

CODE NO.	MATERIALS	WIDTH	QUANTITY	CODE NO.	MATERIALS	UNIT	QUAN.
29	11 oz. Army Duck	40"	40	610	Size ticket	M	12
					36/B Br. buttons	G	108

CUS NO.	CUSTOMER	LOT NO.	LABELS	PACKAGING	P. R. CHANGES

EXHIBIT 1

STANDARD COST RECORD

DESCRIPTION	DATE	CUSTOMER	STYLE NO
Hunting Coat	SIZE SCALE 37-49	SIMILAR TO	CODE NO.
DIRECT MATERIALS	STANDARD COST PER DOZ.	ESTIMATED	ESTIMATED

CODE	DESCRIPTION	WIDTH	QUANTITY	PRICE	EXTENSION	PRICE	EXTENSION	PRICE	EXTENSION
	BODY MATERIALS			$	$	$	$	$	$
23	11 oz. Army Duck	40"	40	.65	26.00				
	TOTAL				26.00				
	TRIM	UNIT							
	Thread				.93				
610	Size Ticket	M	12	.80	.01				
420	36/E Br. Buttons	G	108	.60	.45				
	TOTAL				4.00				
	TOTAL MATERIALS				30.00				
	TRANSPORTATION IN			%		%		%	

LABOR & EXPENSE	COST CENTER	RATE	SAH	EXTENSION	SAH	EXTENSION	SAH	EXTENSION
CUTTING	50	2.00	1.00	2.00				
SEWING	51	1.50	12.00	18.00				
INSPECTION	50	1.50	.50	.75				
TOTAL LABOR & EXPENSE				20.75				
STANDARD MANUFACTURING COST				50.75				
ADMINISTRATION								
SELLING—CHAIN—JOBBER—RETAIL								
PROFIT & LOSS				9.00				
TOTAL STANDARD COST				59.75				
COMMISSION %								
DISCOUNT %								
MARK-UP %				5.30				
STANDARD SELLING PRICE				65.05				

EXHIBIT 2

When an order is received, the manufacturing data sheet (Exhibit 1) based on a dozen garments is made up. The description and the material quantity standards are shown on the front of the sheet, and on the back are listed the operations to be performed and the standard allowed hours required. The information on this sheet is then carried over to the standard cost record sheet (Exhibit 2) on which the standard cost is developed by costing the materials and labor at standard rates.

When the garment desired by the customer has been manufactured previously a standard cost is already available since the standard cost record sheet described above will have been prepared at some earlier date. Complete files of these standard cost records are maintained for this purpose. Procedures followed in setting standard costs for products made for stock and for products made to special order of the customer are identical.

Orders received are broken down to economic lot sizes to be processed in the factory. Since many different orders are always in process at the same time, careful planning and scheduling of production is necessary. Operation time standards are essential for this purpose.

Material and Labor Cost Standards

The material quantity standards for the major materials of the garment are determined by the use of templets or patterns designed for the average size chosen. These templets are arranged to give the best usage of the material, and the standard yardage is determined from these areas plus an allowance for end pieces and lappings. This standard is shown on the lower left-hand side of the manufacturing data sheet (Exhibit 1). Standard quantities for the miscellaneous items of material such as buttons, zippers, tags, purchased pockets, etc. are obtained by inspection of the garment and are listed on the lower right-hand side of the data sheet. The standard material quantities are transferred from the manufacturing data sheet to the standard cost sheet (Exhibit 2), where they are multiplied by standard prices. Standard material prices are determined by annual forecast of the cost of material to be purchased, tempered by the inventory on hand at the time the forecast is made.

The labor operations to be performed on the garment are found by careful analysis of the laying out of templets, the material cutting and trimming, the sewing, pressing, inspecting, etc. By study-

ing these operations in the light of recorded motion and time study data, standard times can be determined and entered on the standard cost record sheet. Standards set by this method for pricing purposes are temporary but are used until additional orders are received. Then they are revised by study of actual time on the previous order. The final labor time standards are also used as the basis for an incentive wage payment plan.

Operation time standards are summarized in standard hours for each of three departments, viz., cutting, sewing, and inspection. The time to process a dozen garments of the specified design in each department is entered on the standard cost record and extended by the standard hourly rate for labor and overhead expense combined. The standard labor rate is the average rate being paid at the time the standards are set.

Overhead Cost Standards

Standard hourly overhead rates for each cost center or department are determined by dividing the standard allowed hours at the practical production capacity of the department into the budgeted expense for the department. The budgeted expenses are taken from the flexible budget for each department and to these are added the prorated general overhead expenses budgeted. Some of the rates for the stitching centers have been found to be so nearly alike that they have been averaged, and only three rates are used. The selling, administrative, and all other expenses are applied to the job using a standard rate times the manufacturing cost. The standard cost sheet is completed by adding the mark-up to the cost to determine the selling price. Flexibility in pricing to meet competition can be obtained by varying the mark-up figure.

Cost Control—Material Costs

Standard costs for pricing would be of little value unless the actual costs were kept within the standard costs. When prices have been based upon the expectation that the goods can be made for the standard cost, any unfavorable variance results in a decreased profit. Hence the company takes the same standards developed for pricing and applies them for the control of costs during the process of manufacture. Control of costs has been maintained within about one per cent, above or below standard. This would seem to represent both good standards and successful control.

The factory is made cost conscious by keeping the standards before the shop personnel and by promptly following up off-standard performance. For example, in the cutting department, if the marker finds that he is going to exceed the standard yardage of cloth allowed, he checks with his supervisor to determine whether it is best to go ahead or to try to rearrange the templets to meet the standard. Quantity variances in use of body material for garments occur mainly in the arrangement of templets for sizes other than the average size upon which the standard cost is set. Since it is possible to bring such variances to the attention of the proper authority before the material is cut, a decision can be made as to whether to use additional labor in rearranging the templets or to use more than the standard quantity of cloth. Markers are highly skilled and carry a relatively high hourly rate whereas some materials are expensive and others are cheap. A control plan which thus enables the decision to be made before the variance occurs can often avoid substantial overruns in the cost of an order.

The cost of materials is controlled through the standards appearing on the standard cost sheet (Exhibit 2). Control methods have been adapted to the different types of materials. Thus for the body material, a card for the shop job is issued to the cutting department showing the article, style number, order number, kind of material, and the standard quantity needed. When the job is to be laid out and cut, the card is the basis for the issue of material. An excess length of cloth of the correct width is issued to the cutting department. The material is lapped for the required layers and length as determined from the standard layout for the required sizes, marked from the templets and cut. The extra lengths are then returned to the stockroom with a statement of the remaining yardage in the roll. The card issued to the cutting department is marked with the material issued, the amount returned, and the difference or net yardage actually used. Any errors in the yardage of the material returned will be picked up when the material is reissued on another job. These shop cards are not convenient for filing and analysis purposes since they are often received in poor condition and a great number are required for some jobs. Hence the quantity and cost of body material used are summarized on the card shown in Exhibit 3.

TEST 9/4

TRIM NUMBER — TENS 7, UNITS 1

STYLE NUMBER — THOUSANDS 7, HUNDREDS 1, TENS 7, UNITS 1

DATE CUT: 2/18/48

CUT NO.

TRIM NO.

OUR STYLE NO.

CUST. STYLE NO.

QUANTITY: 52

CUTTING TIME

	MARK	LAY	CUT	TRIM	SHADE MARK	TOTAL	STANDARD	VARIANCE
	40	15 2	12 2	15 1		46 5	52 0	5 5

MATERIAL VARIANCE

CODE	WIDTH	STD. YDS.	ACT. YDS.	PRICE	EXTENSION
23	40"	2080	2100	.65	$ 1365 00
		TOTAL ACTUAL MATERIAL			$ 1365 00
		TOTAL STANDARD MATERIAL			1352 00

924.56 — MAT'L: $ 13 00

925.56 — LABOR: $

ACCT

$

ACCT

$

CUT NUMBER — THOUSANDS 7, HUNDREDS 1, TENS 7, UNITS 1

DATE CUT — MONTH 1, YEAR 45 46 47 48

FORM C.

EXHIBIT 3

This card is made out for each shop order and is identified through the information at the left end and by the method of punching. The actual material usage is obtained from the shop card, while the standard is obtained from the standard cost sheet. The actual yardage is extended at the standard price and compared with the standard cost, the difference being recorded in the upper right-hand corner. These cards can be thumbed through each day to pick out large variances, or the variances can be tabulated.

The other materials, with the exception of thread, are issued in standard quantities determined by the standard cost record sheet. From the latter a bill of materials is prepared and issued to the storeroom where a clerk measures and assembles the items in a box which goes along with the body material. The standards allow for losses of about one per cent on certain items and hence favorable usage variances can be obtained. If, due to loss or breakage, the standard quantity is not enough to complete the order, a requisition for additional materials must be made out by the department supervisor. This requisition calls the supervisor's attention to the variance. The requisitions are collected by departments and charged to material usage variance accounts at the end of the month. No attempt is made to charge these variances against specific job orders since they are so small as to be negligible.

Thread is a comparatively small item of cost and is controlled by monthly comparison of the actual cost of the quantity issued for all orders with the corresponding standard cost. It can thus be seen that control of the major items in material cost is by individual shop order while the other items are controlled by periodic comparison of actual cost with standard cost.

Cost Control—Direct Labor

Control procedures for direct labor costs, like control procedures for material costs, are adapted to the operations performed in each department. Large labor variances are expected in the cutting department and, for this reason, the actual time consumed in marking, laying, and other operations in this department are recorded by jobs. This is done by entering the hours used on the back of the material shop card and then summarizing the data on the card shown in Exhibit 3. Actual hours, standard hours, and the variance in hours are shown in the column headed "cutting time." A space at the right-hand side of the card has been

provided for the dollar amount of the variance, but this information is not filled in because it has not been found useful. Control is applied by use of the variance in hours rather than in standard dollars. This control is exerted on the day that a shop order is completed in the department, a matter of approximately a day after the job is started by the cutting department.

Employees in the sewing and inspection centers are paid largely by piece rate and time tickets show only the standard time. Variances arise when actual daily time is greater than allowed time for the production attained, due to slow work, lost time on repairs, etc. Since variances on these operations are relatively small, the actual labor cost is compared with the corresponding standard cost on a weekly basis instead of on a shop order basis.

Cost Control—Overhead

Overhead costs are controlled through the use of flexible budgets. The budget for each department contains only those expenses

THE DRYBAK CORPORATION
COST AND VARIANCE STATEMENT
FACTORY Center Name ____ No. ____

Account	Extra Budget Allow.	Current Allow.	Actual	Var.	Year to Date Actual	Year to Date Variance
Direct Labor						
Other Labor						
Total Direct Labor						
Total Indirect Labo						
Machine Parts						
Shop Indirect Materials						
Department Total						

Keyman

	Activity (Volume)	Production	Standard	Effy. Ratio	T.C. Ratio
	Current				
	Year to Date				

	Recovery	Month	Year to Date
	Standard Budgeted Recovery		
	Recovery at Indicated Activity		

EXHIBIT 4

which are controllable by the executive in charge of the department. These expenses are composed principally of labor, machine parts, and materials which are accounted for as indirect charges to product, but which are directly chargeable to the specific department. No prorated expenses are included in the budgets, but general plant overhead, which includes such items as power, light, office expense, vacation pay, depreciation, etc., is budgeted separately and is controlled on an over-all basis.

The flexible budget for each department is set up by accounts and is classified into fixed, variable, and semivariable components. By thus separating the fixed portion from the variable portion, the total allowable amount for each item can be determined for any level of activity by adding to the fixed amount the rate per hour for variable expense times the standard hours. Weekly comparisons between budgeted and actual indirect labor and monthly comparisons for other budgeted expenses are made. A report (Exhibit 4) is prepared listing variances.

Due to the presence of fixed costs, the amount of overhead charged to production agrees with the amount budgeted only when the plant operates at practical capacity. Differences between the budgeted overhead and the absorbed overhead arise when actual volume differs from practical capacity and these differences are volume variances. The volume variances are reported by departments and for the factory as a whole in a variance summary for top management (Exhibit 5). The recovery of fixed expenses is reported to each department for information only, since top management is considered responsible for volume variances.

Extra budgetary allowances are made to cover expenses of a major nature which were not foreseen at the time the departmental budget was set up and over which the supervisor responsible under the budget has no control. For example, the company used the wage rates then in force when the budget for 1948 was prepared. Subsequently wage rates were increased. The supervisor was then given credit for the increase in his labor costs by entering the amount in the column marked "extra budgetary allowance" on the form shown in Exhibit 4. The total allowance thus is determined by adding this extra allowance to the usual allowance based on the budget. The net difference between actual expenses and the total allowance constitutes the variance for which the supervisor is responsible. Extra allowances are also shown on the variance summary statement (Exhibit 5) since they constitute

THE DRYBAK CORPORATION

VARIANCE SUMMARY

Cost Center	Direct Labor	Other Control	Extra Budget. Allow.	Volume	Total	Total Year to Date
51 Breech	173	85		-64	194	
52 Wool Coat	-72	-104		-215	-391	
53 Pack Coat	90	37		126	253	
54 Mits & Caps	36	73		89	198	
56 Training	-48	-37		-49	-134	
57 Westfield	141	90		212	443	
58 Cutting	65	40		35	140	
59 Inspection	23	35		24	82	
61 Factory-General		-247		316	69	
Total	408	-28		474	854	
01 Admin.		327		154	481	
02 Compt.		115		96	211	
03 Duplex		-236		32	-204	
10 Procurement		78		63	141	
62 Rent		145		175	320	
Total		429		520	949	
11 Sales		-297		216	-81	
12 Shipping		140		185	325	
Total		-157		401	244	
Grand Total	408	244		1395	2047	

RATIOS	Month			Year to Date		
	Volume	Efficience	Total Cost	Volume	Efficience	Total Cost
Manufacturing						
Administrative						
Sales						
Total						

RECOVERY

By Inventory			Non-Inventory		
Cost Cent.	Month	Year to Date	Cost Cent.	Month	Year to Date
51	12,320		01		
52	7,655		02		
53	11,912		03		
54	1,836		10		
56	825		11		
57	6,419		12		
58	5,565				
59	2,872				
61	6,940		Total		
62	3,790				
			P & L		
Total	60,134		Total		

EXHIBIT 5

deviations from the budget which have been approved by management.

Cost Control—Selling, Administrative, and Other Expenses

To control selling, administrative, and other expenses a flexible budget similar to the manufacturing overhead budget is used. Sales dollars instead of standard allowed hours are used to measure activity. In the same way, the actual expense and current budgeted allowance are compared by items for control of cost performance, and the budget and charge to profit and loss are compared for the variance due to volume of sales. Variances are summarized and shown on the variance summary.

Reporting Cost Information to Management

One of the most important features of any cost control plan is the reporting of information about costs and variances to the persons responsible for the costs. Since top management of this company is so close to detailed operations, formal reports are kept to a minimum. Thus the cutting department cards shown in Exhibit 3 are used for current control purposes by sorting out those cards showing variances. These cards also form a valuable record of cost experience which is much used in preparing standard costs for new orders.

A weekly departmental payroll summary (Exhibit 6) is sent to supervisors. Departmental, general factory, selling, administrative, and other expenses are reported monthly to the executives responsible for control of these expenses on the form shown in Exhibit 5. Using the principle of exceptions, the monthly profit and loss statement (Exhibit 7) shows only the variances and their effect on profit rather than the details of actual costs. The budgeted net profit is the profit determined at the beginning of the year. By adjusting this profit for the volume gain or loss due to change in sales income plus the change in overhead absorption, the standard profit for the actual sales is determined. The actual net profit is computed by adjusting the standard profit by the total of the other variances. An analysis of variances is shown in a section of the statement which follows the net profit before federal taxes.

Use of Standards in Accounting for Costs

To simplify the accounting procedure, one inventory account is used for raw materials, work in process, and finished goods.

PAYROLL SUMMARY

VARIANCE		ACCOUNT	EX. B. ALLOW		CUR ALLOW		ACTUAL	
		MEASURED DIR. LAB.						
		EXCESS ALLOW CONTROL						
		MAKE UP						
		REPAIR & SHOP LOSSES						
		EXECUTIVE						
		SUPERVISION						
		FLOOR HELP						
		CLERICAL						
		SUPPLIES CLERK						
		JANITORS & WATCHMEN						
		TRAINING PROGRAM						
		PATTERN						
		EXPERIMEN. & SAMPLES						
		INSTRUCTION						
		SHIPPING LAB.						
		TRUCK DRIVER						
		STOCK EXPENSE						
		OTHER LABOR						
		MACHINE MAINT. LAB.						
		OVERTIME						
		VACATION PAY						
		HOLIDAY PAY						
		TOTAL PAYROLL						

	$ ACT.	UNIT	PRODUCED	BUDGETED	$ ACT.	
	COST CTR.	ACT. HRS.		COST CTR.		
	WEEK ENDED (OR MONTH OF)					

COMMENTS

EXHIBIT 6

THE DRYBAK CORPORATION
PROFIT & LOSS STATEMENT

Month		Year to Date
235,610	Net Sales	
20,500	Budgeted Net Profit	
2,358	Volume Gain or Loss	
22,858	Standard Profit on Current Sales	
773	Total Variances	
23,631	Net Profit before Federal Taxes	
	ANALYSIS OF VARIANCES	
-570	Mark Up (or Down)	
230	Variety Made & Sold	
-340	Total Mark Up & Variety	
408	Direct Labor	
-28	Factory Expense	
-157	Selling Expense	
429	Administrative Expense	
652	Total Controllable	
390	Purchase Price	
136	Material Usage	
-	Extra Budgetary Allowance	
-65	Profit & Loss Net Variances	
461	Total Uncontrollable	
773	Total Variances	
	PROFIT & LOSS INCOME & CHARGES	
	Discount Earned	
	Anticipation Earned	
	Profit on Sale of Assets	
	Discount Allowed	
	Anticipation Allowed	
	Interest Paid	
	Social Security Taxes	
	Reserve for Bad Debts	
	Budgeted Income & Charges	
	Profit & Loss Net Variances	
	RATIOS	
9.1	Profit to Sales - Standard	
10.0	Profit to Sales - Actual	
104.7	Sales Activity	
101.6	Manufacturing Activity	

EXHIBIT 7

This eliminates the need for any transfer entries while goods are on hand. All charges to the inventory account for materials, labor, and overhead are at standard cost. Thus incoming material is debited to inventory at standard price and any purchase price variance entered in a price variance account. Material usage variances are removed from the inventory account to variance accounts, the entry being based upon a summary of the records on which variances are reported.[1] Labor and overhead costs are debited to inventory at standard rates for standard hours produced, with the difference between these debits and credits to payroll and expense accounts being carried to variance accounts.

Perpetual stock records for all raw materials are maintained in terms of quantities only. Stock cards showing quantities of finished goods on hand are also kept. By pricing quantities at standard manufacturing cost, the company's inventory can be determined in a comparatively short time.

When finished goods are shipped to customers, a transfer from inventory to cost of sales is made, using the standard manufacturing cost of the articles sold. The product costs used for this purpose are obtained in the process of setting standard costs for pricing. While the more important differences between standard and actual costs on each order are recorded on product cost cards shown in Exhibit 3, these differences are charged in total to variance accounts and it is not necessary to carry numerous variations in actual cost through the inventory account and its subsidiary records. Control over costs is exercised at the source and in this process comparisons between actual results and standards are made by inspecting or by summarizing subsidiary records. Hence the collection of both actual and standard costs in the accounts can be limited to the data necessary for preparation of financial statements. The company thereby avoids much bookkeeping work which would otherwise be required for entering unit costs in perpetual inventory records, distribution of labor costs to orders, and routine proration of overhead to departments and to job orders.

The company reviews all standard costs annually preceding the annual closing which is made on November 30. Revisions in standard costs are put into effect with the beginning of the new fiscal year on December 1. Any adjustment of inventory cost oc-

[1] These records are the material usage card (Exhibit 3) and the requisitions for material in excess of standard quantity.

casioned by changes in standard costs is made through use of an inventory valuation reserve which is subsequently closed to cost of goods sold. Since subsidiary stock records are kept in quantities only, little clerical work is required in adjusting inventory records to reflect changes in standard costs.

A policy of valuing inventories at the lower of standard cost or market is followed by the company. Variances from standard costs are charged to cost of sales monthly, and inventory in monthly statements is at standard cost.

Relationship Between Budget and Standards

At the end of each year a budgeted profit and loss statement for the coming year is prepared. The anticipated sales income based upon market conditions and tempered by plant capacity is determined by top management. The large amount of special order work together with the changing design of products makes it impossible to break down the budgeted sales into quantities of specific products. Hence the production budget is built in terms of standard hours.

The flexible budgets in use are reviewed and revised to incorporate anticipated changes in prices and operating methods. Using the forecasted standard hours of activity and the standard rate per hour for labor and overhead, the expected amount of these elements of manufacturing cost can be inserted into the budget. Material costs cannot be built up from product cost standards because it is not possible to predict what specific articles will be manufactured. Hence the over-all cost of material for the purpose of the budget is determined by subtracting the net profit plus labor and overhead from the forecasted sales income.

No variances are forecast in the budget, for it is expected that the standards will be met by actual operations.

Conclusion

This case study illustrates an application of standard costs which has successfully met management's needs in a company characterized by special order production and many changes in product design. The plan of cost record keeping is also simple and economical.

This company's needs for costs begin with preparation of price quotations. Using established labor time and overhead cost standards together with material requirements of the garment in ques-

tion, a predetermined cost is obtained for pricing purposes. Since this cost figure is built up by costing individual manufacturing operations which are used in making the goods called for by the order, these detailed costs are used as standards with which to control manufacturing costs. Control over all major items of cost is exercised at the source by providing factory personnel with the standard for each operation to be performed and with prompt reports on actual performance relative to the standards. These reports are simple and, in most cases, informal. Financial reports stressing the effect of variances on anticipated profits keep top executives informed as to the effectiveness with which cost control is being maintained. These reports stress the causes of deviations from the budget rather than actual amounts spent for various purposes.

Use of the standard costs for costing production and inventories avoids the necessity for carrying numerous variations in actual costs through the cost records, a practice which requires substantially less expense for bookkeeping than would be needed if actual costs were accumulated by job orders. Closing inventories are costed at standard, although these standard costs are subject to adjustment to the extent that such costs are not recoverable in future sales.

Standard costs are kept current by annual revision. In connection with the preparation of the budget for the coming year, standard costs are reviewed in order that they may serve as controls over performance in carrying out the operating plan contained in the budget.

List of Companies Participating in Study of Standard Costs

The following companies were among those participating in this N. A. C. A. research study by contributing information regarding their use of standard costs:

American Asphalt Roof Corp.
American Hard Rubber Co.
American Smelting & Refining Co.
Animal Trap Company of America
Armstrong Cork Co.
Arms Textile Manufacturing Co.
A. Schrader's Son
Atlas Powder Co.
Avon Sole Co.
Bridgeport Fabrics, Inc.
Bridgeport Thermostat Div.
Robertshaw-Fulton Controls Co.
Bryant Electric Co.
Carrier Corp.
Cambridge Paper Box Co.
Chase Brass & Copper Co.
Columbia Mills, Inc.
Commonwealth Shoe & Leather Co.
DeLaval Separator Co.
Dennison Manufacturing Co.
Drybak Corp.
Eagle Pencil Company, Inc.
Eastman Kodak Co.
E. W. Carpenter Manufacturing Co.
Fasco Industries, Inc.
Federal Bearings Co., Inc.
Forbes Lithograph
Manufacturing Co.
General Electric Co.
Gilbert & Barker Manufacturing Co.
Goodall Rubber Co.
Hamilton Watch Co.
Henry G. Thompson & Son Co.
Hyde Manufacturing Co.
International Silver Co.
Intertype Corp.
Keystone Watch Case Div.,
The Riverside Metal Co.
Lehn & Fink, Inc.
Monroe Calculating Machine Co.
Neptune Meter Co.
Permatex Company, Inc.
Pitney-Bowes, Inc.
Reed-Prentice Corp.
Ritter Company, Inc.
Rockbestos Products Corp.
Sargent & Co.
Scovill Manufacturing Co.
Scranton Lace Co.
Sidney Blumenthal & Co., Inc.
Strathmore Paper Co.
S. Stroock & Co., Inc.
Textron, Inc.
Trumbull Electric
Manufacturing Co.
United-Carr Fastener Corp.
Veeder-Root, Inc.
Western Electric Co.
White & Wyckoff
Manufacturing Co.
Whitin Machine Works
Wickwire Spencer Steel Div.,
Colorado Fuel & Iron Corp.
York Corp.

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